

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF MASSACHUSETTS**

SINGULAR COMPUTING LLC,

Plaintiff,

v.

GOOGLE LLC,

Defendant.

C.A. No. 1:19-cv-12551-FDS

**GOOGLE LLC’S REPLY BRIEF**  
**IN SUPPORT OF RULE 12(B)(6) MOTION TO DISMISS**  
**FIRST AMENDED COMPLAINT FOR**  
**LACK OF PATENTABLE SUBJECT MATTER**

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Plaintiff's Opposition suffers from the same deficiencies as its First Amended Complaint (FAC): it rests on conclusory statements about non-abstractness, unconventionality, and novelty, without demonstrating support for those statements in either the claims or the written description. While Plaintiff cites *Aatrix Software, Inc. v. Green Shades Software, Inc.*<sup>1</sup> to argue that Google's motion is premature, Plaintiff does not identify any dispute requiring factual development prior to resolving patentability. Indeed, the Court can grant Google's motion even when assuming, per *Aatrix*, that all of Plaintiff's *factual allegations* are true. But *Aatrix* does not require accepting as true Plaintiff's *conclusory statements* and *arguments* regarding non-conventionality and novelty. Similarly, Plaintiff argues that Google's motion is premature under *Berkheimer v. HP Inc.*<sup>2</sup> But again contrary to Plaintiff's argument, *Berkheimer* does not require accepting Plaintiff's assertion that claim construction is required when Plaintiff identifies no claim construction issue that bears on resolving Google's Motion.

Plaintiff's Opposition fails to address the core problem with its representative claims: they are directed to the abstract idea of doing low-precision arithmetic across a high dynamic range of numbers. Regardless of the purported novelty of the nomenclature or the idea of doing it on a computer chip, Plaintiff cannot dispute that the claims boil down to performing imprecise arithmetic. Beyond that abstract idea, there is no inventive concept deserving of patent eligibility. The claims themselves are not limited to any particular technical solution or improvement in computing, much less a novel one. Instead, the claims are exactly the kind that the Federal Circuit and the Supreme Court have repeatedly found patent-ineligible in a string of cases that Google cited in its opening Memorandum (Memo)—cases that Plaintiff mostly ignores.

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<sup>1</sup> 882 F.3d 1121 (Fed. Cir. 2018).

<sup>2</sup> 881 F.3d 1360 (Fed. Cir. 2018).

**I. GOOGLE’S MOTION IS NOT PREMATURE.**

**A. Plaintiff has not identified any fact dispute relevant to patentability.**

In the section of its Opposition arguing that Google’s motion is premature, Plaintiff claims to have “allege[d] that the claimed invention: (a) is not conventional; and (b) is an improvement to computer technology.” Opp. at 7. What follows is a lengthy block quotation from the FAC, apparently intended to identify the factual disputes precipitated by its allegations. But these disputes fall into two categories: material not actually claimed in the representative (or other) claims or conclusory allegations regarding non-conventionality or novelty. Neither is relevant to deciding patentability, even at the motion-to-dismiss stage.

It is well settled that patentability turns on the limitations of the claims themselves. *See, e.g., Ericsson, Inc. v. TCL Commc’n Tech. Holdings Ltd.*, 955 F.3d 1317, 1330 (Fed. Cir. 2020); *Am. Axle & Mfg. Co. v. Neapco Holdings, LLC*, 939 F.3d 1355, 1363 (Fed. Cir. 2019); *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 766 (Fed. Cir. 2019); *Elec. Power Grp., LLC v. Alstom, S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016); Memo at 16. Here, however, there are several features referenced in Plaintiff’s block quotation from the FAC that are not claimed in the patent. Among them are features in a device the inventor Dr. Bates allegedly built *but did not claim in the patents-in-suit*. Specifically, those features include a “software program that performed . . . neural network image classification” and “physical characteristics in terms of its number of transistors . . . semiconductor fabrication process and power draw.” Opp. at 7 (citing FAC, ¶14). Even accepting these allegations about Dr. Bates’ device as true under *Aatrix*, because they are not claimed, they are not relevant to patentability.

Plaintiff’s FAC only identifies two features claimed in the representative claims: the limitations regarding dynamic range and error (FAC ¶ 46a) and the number of LPHDR execution units (FAC ¶ 46b). Setting aside that the number of execution units is not claimed in

representative claim 4 of the '961 patent, and that the error levels and dynamic ranges vary by claim, Google's opening Memo explained why these features do not support patentability. In brief, the different error levels and dynamic ranges are just expressions of the abstract idea, are arbitrary number limitations, and are themselves conventional. Memo at 16-17. The specification also admits that prior art disclosed having a high number of execution units. Memo at 18-19 (citing '273 Patent at 3:6-18, 3:49-50, 3:52-53, 3:58-60, 4:65-5:10). Under *Aatrix*, the Court can accept as true Plaintiff's factual allegations, which are just that these limitations exist in the claims. But where Plaintiff identifies no factual dispute regarding the statements in the specification, *Aatrix* does not require accepting as true Plaintiff's contradictory and conclusory statement that these features were non-abstract or non-conventional. *See, e.g., SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1166 (Fed. Cir. 2018). As the Federal Circuit explained in *SAP*, which was decided after and referenced *Aatrix*, patentability "may be, and frequently has been, resolved on a Rule 12(b)(6) or (c) motion where the undisputed facts, considered under the standards required by that Rule, require a holding of ineligibility under the substantive standards of law." *Id.*; *Yanbin Yu v. Apple, Inc.*, 392 F. Supp. 3d 1096, 1102, 1108 (N.D. Cal. 2019); *RingCentral, Inc. v. Dialpad, Inc.*, 372 F. Supp. 3d 988, 995 (N.D. Cal. 2019); *see Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1346 (Fed. Cir. 2018) (affirming judgment of non-patentability, *on the pleadings*, where the patent did not support the argument that it embodied an inventive concept).

**B. Plaintiff identifies no claim construction dispute relevant to patentability.**

Plaintiff contends that Google offered a claim construction of "low precision" and then says it "does not agree with Google's unilateral claim construction which is inconsistent with the expressed language of the claims at issue." Opp. at 8. Setting aside that the statement in Google's Memo was a description of the patent claim, not an argument about claim construction, Plaintiff

does not explain how that description is inconsistent with the claim language or specification, such that it would be improper to consider at this stage. Furthermore, Plaintiff does not itself offer any proposed construction. Given its inability to identify what the alleged dispute is, Plaintiff's bald assertion that there is a claim construction dispute does not justify denying Google's Motion. Rather, because Plaintiff has offered "no proposed construction of any terms or proposed expert testimony that would change the § 101 analysis," claim construction questions do not present any impediment to this Court's determining that Plaintiff's patents are "ineligible under § 101 at the motion to dismiss stage." *Cleveland Clinic Found. v. True Health Diagnostics LLC*, 859 F.3d 1352, 1360 (Fed. Cir. 2017); *see Elec. Commc'n Techs., LLC v. ShoppersChoice.com, LLC*, 958 F.3d 1178, 2020 WL 2479692, at \*4 (Fed. Cir. May 14, 2020) (relying on *Cleveland Clinic* post-*Berkheimer*).

Moreover, the Court can grant Google's Motion even without accepting the description of low precision that Plaintiff purports to dispute. The Court can instead rely on the wording from the "Summary" in the specification describing the same phrase: "'low precision' processing elements perform arithmetic operations which produce results that frequently differ from exact results by at least 0.1% . . . ." '273 Patent at 2:28-31. Whatever formulation the Court uses, the issue is the same: are the claims directed to low-precision arithmetic and therefore, to an abstract idea? Under Plaintiff's own description, they are directed to a way of doing arithmetic that "produce[s] results that frequently differ from exact results by at least 0.1%." '273 Patent at 2:29-30. Evaluating whether a claim so described is abstract does not require claim construction.

Plaintiff's argument regarding a purported claim construction dispute further refers to dynamic range and precision. Opp. at 8. Plaintiff states that "high dynamic range [] is defined in the claims using very precise limitations." *Id.* Plaintiff further states that "low-precision is defined in the claim," *see id.*, apparently referring to the error limitations contained in the claims.



Google does not dispute that the representative claims contain one of two dynamic ranges and various error limitations. Instead, what Google disputes is whether any of these limitations demonstrate patent eligibility, given the lack of any such tie in the claim and specification's admissions about the variability of these dynamic ranges and errors. Memo at 16-17; *infra* Part III. This dispute does not require any claim construction for resolution.<sup>3</sup>

**C. None of the arguments that Plaintiff makes under the judicial notice rubric affects this Court's ability to consider Google's Motion.**

The Court can consider uncontroversial and incontrovertible facts whose veracity Singular does not dispute, *e.g.*, how ancient Greeks calculated square roots or the historical use of slide rules. *See* Fed. R. Evid. 201(b), (c), (d); *see, e.g., Ericsson*, 955 F.3d at 1327 (referencing ordinary human activities in considering patentability). The Court can also take judicial notice of the 1985 IEEE 754 standard, which is cited meaningfully in the specification and whose content is undisputed. *See Uniloc USA, Inc. v. Rackspace*, 18 F. Supp. 3d 831, 834 (E.D. Tex. 2013). But even absent doing so, the Court can grant Google's motion without taking judicial notice of these facts, which do not provide the underpinning of Google's argument.

**D. Google's Memo explicitly addressed all three representative claims.**

Inexplicably and incorrectly, Plaintiff contends that Google's Memo failed to address representative claim 7 of the '156 patent and representative claim 4 of the '961 patent. *Opp.* at 3, 4, 14. In fact, Google separately addressed all three of the representative claims. *See* Memo at 8 & nn. 6-7, 18-19. After laying out the core elements common to all the claims with reference to representative claim 53 of the '273 patent, Google identified the overlapping and supplemental elements in the other two representative claims in footnotes 6 and 7 of its Memo. *Id.* at 8 & nn.

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<sup>3</sup> Because Google's position here does not depend on rejecting any construction offered by Plaintiff, this case differs fundamentally from the pre-*Alice* decision from this Court in *Sandborn v. Avid Tech., Inc.*, No. 11-11472-FDS, 2013 WL 4784265 (D. Mass. Sept. 5, 2013).

6-7. Furthermore, Part V.B.3 of Google’s Memo specifically addressed the architectural aspects of all three representative claims, including those aspects of claims 7 of the ’156 patent and claim 4 of the ’961 patent that differ from claim 53 of the ’273 patent. *Id.* at 18-19.

## **II. THE PATENTS ARE DIRECTED TO AN ABSTRACT IDEA.**

Plaintiff does not address the controlling Federal Circuit decisions cited in Google’s Memo to demonstrate why the representative claims are directed to an abstract idea. Indeed, Plaintiff does not address Google’s argument regarding abstractness in any specific way. Rather, Plaintiff simply states that Google has oversimplified the patent, identifies a purported problem in the prior art, and then provides a one-and-a-half-page block quotation of allegations in its FAC regarding the purported advances offered by the patents-in-suit.

But whether the patents offered any advance over the prior art is irrelevant to the question of abstractness under *Alice* step 1—that is part of the step 2 analysis. Instead, abstractness depends upon whether the claim as a whole is directed to an abstract idea or to a specific improvement in computing technology. *Compare, e.g., Ericsson*, 955 F.3d at 1326-27, with *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1338-39 (Fed. Cir. 2016). Moreover, “where [] the bulk of the claim provides an abstract idea, and the remaining limitations provide only necessary antecedent and subsequent components, the claim’s character as a whole is directed to that abstract idea.” *Ericsson*, 955 F.3d at 1326. Here, Plaintiff’s Opposition does not dispute that there is an abstract idea embedded in the claims: doing low-precision arithmetic across a high-range of numbers. Opp. at 9-12 (discussion of *Alice* step 1). Google’s exposition of this abstract idea and citation of examples of using low-precision arithmetic in daily life are not an “attempt[] to trivialize the inventions claimed in the patents-in-suit.” Opp. at 15. Instead, Google is simply comparing Plaintiff’s claims to everyday human activity to demonstrate why they are, in fact, directed to an abstract idea. Memo at 11-13. As noted above, the Federal Circuit has routinely

used this kind of comparison between patent claims and everyday activity when evaluating patentability. *See, e.g., Ericsson*, 955 F.3d at 1327 (noting that claims were directed to the abstract idea of controlling access, which was long practiced in libraries, banks, and offices).

The remaining question is whether, notwithstanding their focus on an abstract arithmetic idea, the claims “had the specificity required to transform a claim from one claiming only a result to one claiming a way of achieving it.” *SAP*, 898 F.3d at 1167. Plaintiff cannot satisfy that bar. Plaintiff appears to argue that the claim is not abstract because the inventor sought to solve a problem that existed in prior art computers: that they “used massive amounts of transistors, but were only capable of performing a relatively small number of operations.” Opp. at 11. Plaintiff thus alleges that the patents are directed to an invention that is a “novel architecture” of a device “by requiring a far smaller number of transistors per multiplication operation done by the one or more LPHDR units.” Opp. at 11 (citing FAC, ¶44a). But this makes no sense. None of the representative claims are drawn to an invention that uses fewer transistors per multiplication operation. To the contrary, the claims have *no limitations whatsoever* regarding either the number of transistors or the number of operations per transistor. *See, e.g., Ericsson*, 955 F.3d at 1330; *Am. Axle*, 939 F.3d at 1363 (holding that unclaimed features cannot support patentability).

Plaintiff’s own allegations describe a patent that simply claims practicing known arithmetic techniques on a computing processor using known hardware design techniques—a scope that would impermissibly monopolize all instances where a processor performs arithmetic with a certain set of numbers (regardless how many transistors may be used to do so). The claims do not require any particular architecture for the LPHDR unit; instead, Plaintiff contends a LPHDR unit is *any* computing unit that does arithmetic in a way that leads to the error rates in the claim and can do calculations across the specified dynamic ranges. That is too abstract to be patentable. *See, e.g., Am. Axle*, 939 F.3d at 1365 (“[A] claim to a natural law concept without

specifying the means of how to implement the concept is ineligible under section 101.”).

Furthermore, while some of the claims require a certain number of low-precision, high-dynamic range execution units, those requirements do not specify a particular hardware design or a number of transistors for those execution units; nor do they have any requirement directed to the purported problem being solved, *i.e.*, the number of transistors per operation. Thus, the claims are not limited to solving the stated problem using a particular technology. *Ericsson*, 955 F.3d at 1327-28; *Am. Axle*, 939 F.3d at 1363; *Elec. Power Grp.*, 830 F.3d at 1355-56. Rather, the claims at issue here are simply directed to the implementation of an abstract algorithm in a general-purpose computing environment, with one or more processors—broadly claimed—as “antecedent[s]” necessary to establishing that environment. *Ericsson*, 955 F.3d at 1326.

Finally, as Google explained in its Memo, the Supreme Court held that abstract mathematical algorithms, such as Plaintiff’s claim of low-precision, high-dynamic range arithmetic, are not patentable, even before *Alice*. Memo. at 9, 11. Plaintiff attempts to distinguish those cases simply by noting that “[u]nlike in *Gottschalk* and *Flook*, however, claims 53, 7, and 4 are all directed to a computer (device) not a computer program.” Opp. at 17-18. That purported distinction ignores clear and indisputable Supreme Court precedent, which holds that “the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention.” *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 573 U.S. 208, 223 (2014). Plaintiff’s attempt to distinguish this Supreme Court precedent does not describe the device claimed as anything more than a “computer.” That the claim covers a “low-precision, high dynamic execution unit” does not make the *computing device* any less generic: the low-precision, high dynamic range aspect describes the algorithm running on the device, which is exactly what the Supreme Court held was insufficient to establish patentability. Plaintiff cites the Supreme Court’s earlier *Diamond v. Diehr* decision, but ignores the explication of *Diehr* in *Alice*: “In

*Diehr*, . . . we held that a computer-implemented process for curing rubber was patent-eligible, *but not because it involved a computer.*” *Alice*, 573 U.S. at 223 (emphasis added, citations omitted). There is simply no basis to disregard applicable Supreme Court decisions based on some purported distinction between a mathematical algorithm and the hardware that it runs on. “[T]he [Supreme] Court found that the purportedly new formula itself was only a mathematical one . . . and given that nothing else in the patent claims exhibited more than conventional pre- and post-solution activity, it concluded that the patent was directed to nonstatutory matter.” *Am. Axle*, 939 F.3d at 1366 (citing *Parker v. Flook*, 437 U.S. 584, 594-95 (1978)).

### **III. THE PATENTS DO NOT INCORPORATE AN INVENTIVE CONCEPT.**

The portion of Plaintiff’s Opposition that ostensibly relates to *Alice* step 2, *i.e.*, whether there is an inventive concept beyond the abstract idea, does not respond to Google’s arguments. Google specifically addressed each purported “advance” alleged in the FAC and explained why it does not establish an inventive concept, even accepting Plaintiff’s *factual* allegations as true. Memo at 13-20 (Part V.B.). Rather than addressing those arguments, Plaintiff again just provides extensive block quotations from its FAC, followed by the conclusory statement that “the asserted claims” are “patent eligible” in light of the “foregoing record [*i.e.*, the block quotations] and the early stage of these proceedings.” Opp. at 15. Such perfunctory allegations do not suffice to establish an inventive concept, even at the motion to dismiss stage, and even after *Aatrix*. *See, e.g., SAP*, 898 F.3d at 1166; *Yanbin Yu*, 392 F. Supp. 2d at 1102, 1108.

Plaintiff makes various other arguments that appear generally directed at the idea of an inventive concept, Opp. at 15-20, which also fail to establish patentability at *Alice* step 2. First, Plaintiff refers to allegations in its FAC regarding infringement,<sup>4</sup> but those allegations are not

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<sup>4</sup> Plaintiff states: “Google incorporated Dr. Bates’ patented LPHDR architecture into all its TPUv2 and TPUv3 computers.” Opp. at 15.

relevant to patentability. Plaintiff then makes the following conclusory statement: “As the claimed solution is necessarily rooted in computer technology in order to overcome a problem specifically arising in the realms of computer networks, the claims are directed to inventive concepts.” Opp. at 15-16 (citation omitted). But this pleads a legal conclusion, not facts. That is, alleging that the patents-in-suit include an inventive concept does not make it so. Moreover, the mere claiming of a low-precision, high dynamic range execution unit just restates the abstract idea itself, practiced on a computer. As such, it cannot supply the inventive concept required at *Alice* step 2. See Memo at 14 (citing *BSG Tech LLC v. BuySeasons, Inc.*, 899 F.3d 1281, 1290 (Fed. Cir. 2018) and *Chamberlain Grp., Inc. v. Tectronic Indus., Co.*, 935 F.3d 1341, 1349 (Fed. Cir. 2019)). Thus, the Court need not even decide whether low-precision, high dynamic range processing was novel, because that idea could not supply the inventive concept regardless.

In any event, the specification admits the conventionality of low-precision, high dynamic range arithmetic. Memo at 17-18. Plaintiff responds that it “is manifestly incorrect” to argue that the specification refers to “conventional computing implementations that used low-precision high dynamic range number formats.” Opp. at 16 (quoting Memo at 5). Tellingly, however, Plaintiff does not address the part of the specification Google cited for its proposition. Memo at 5-6 (citing ’273 patent at 3:57-60, 3:65-4:6, 2:35-39, 5:11-17, 5:26-38). That part of the specification refers to doing arithmetic at lower precision using 16-bit floating point numbers rather than using 32-bit floating point numbers from the IEEE 754 standard; it also refers to a 16-bit floating point having higher dynamic range than an integer representation:

Wikipedia (late 2008) describes the 16 bit floating point representation thusly: “This format is used in several computer graphics environments . . . . The advantage over 8-bit and 16-bit binary integers is that the *increased dynamic range* allows for more detail to be preserved in highlights and shadows. The *advantage over 32-bit single precision binary* formats is that it requires half the storage and bandwidth.

'273 patent at 5:23-30. (emphases added). Plaintiff accuses Google of ignoring subsequent text in column 5 that criticizes "existing GPUs" that "devote substantial resources to 32 (and increasingly 64) bit arithmetic and are wasteful of transistors in the sense described above." Opp. at 16. But this statement does not undo the admission that the prior art used number formats with low precision and high dynamic range. And, the representative claims do not, as noted, contain any limitations regarding the number of transistors used, much less a specific transistor layout or design. Accordingly, the specification's criticism of GPUs is simply irrelevant to the admitted conventionality of low-precision, high dynamic range processing.

In its response to Google's argument, *see* Memo at 16-17, that the claimed error levels or dynamic ranges cannot reflect an inventive concept because they are arbitrary and not based on any inventive discovery or insight, Plaintiff does not address the relevant language from the specification. That language states: "[A] LPHDR arithmetic element may produce results which are sometimes (or all of the time) no closer than" 0.05%, 0.1%, 0.2%, 1%, 2%, 5%, 10%, 20% "to the correct result." '273 patent, at 26:66-27:4. It further states: "Besides having varying degrees of precision, implementations may vary in the dynamic range . . . they process . . . from one millionth to one million . . . from one billionth to one billion . . . [and] from one sixty five thousandth to sixty five thousand." '273 Patent at 27:5-16. Ignoring that language, Plaintiff states that "the '273 patent lists many experiments conducted by Dr. Bates, from which he was able to determine what he believed were suitable parameters for combining dynamic range and acceptable imprecision." Opp. at 18. But Plaintiff does not explain what, if any, experiments disclosed in the specification are reflected in the representative claims, much less how. Plaintiff thus does not dispute that *the claims* broadly cover the abstract idea of low precision, high dynamic range arithmetic, without any tie to Dr. Bates' alleged experiments. *See Am. Axle*, 939

F.3d at 1367 (no inventive concept based on a direction to engage in a “conventional [] process” even if “the desired result to which that process is directed would be new and unconventional”).

Plaintiff argues that the “asserted claims are directed to specific, unconventional improvements in computers,” *see* Opp. at 17, yet does not identify what those improvements are, much less offer any argument for why the use of these long-standing forms of arithmetic in a processor was either unconventional or non-abstract. Indeed, the district court in *Uniloc USA* found similar claims that were directed to improvements in processing floating-point numbers unpatentable at the motion to dismiss stage. Memo at 20 (citing *Uniloc USA*, 18 F. Supp. 3d at 838). Plaintiff attempts to distinguish *Uniloc* by saying that “the asserted claims here are all apparatus claims directed to a then-unknown and unconventional specific computer (LPHDR) architecture that improved computer performance thirty-fold.” Opp. at 19. But here, Plaintiff does not include any limitation in the claims directed to a specific improvement over prior art, nor is Plaintiff claiming a specific technical solution aimed at achieving that result. Plaintiff is just claiming the abstract idea of low-precision, high dynamic range processing itself.<sup>5</sup> Plaintiff also tries to distinguish *Uniloc* by pointing out that it was decided before *Enfish*. But *Enfish* required showing a specific improvement in computing technology to establish patentability. *Enfish*, 822 F.3d at 1338. As explained above and in Google’s Memo, Plaintiff’s representative claims fall squarely within the category of those abstract claims that the Federal Circuit has found unpatentable even after *Enfish*. *See* Memo at 11-13; *supra* Part II.

#### IV. CONCLUSION.

For the foregoing reasons, and for those stated in Google’s opening Memorandum of Law, Google requests that Plaintiff’s First Amended Complaint be dismissed.

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<sup>5</sup> Regardless, even had Plaintiff claimed “improvements in computers” in a general way, this would not distinguish *Uniloc*. 18 F.Supp.3d at 838.



Date: May 29, 2020

Respectfully submitted,

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Date: May 29, 2020

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